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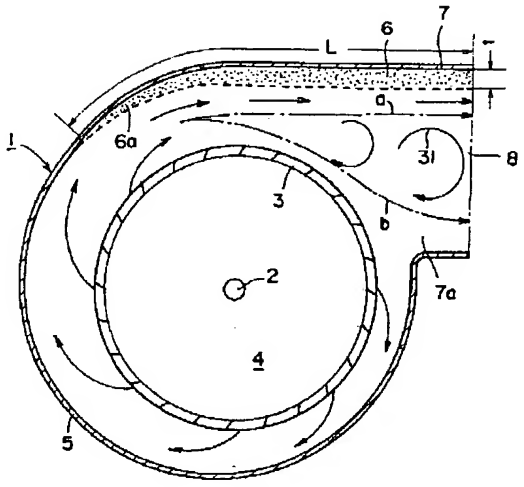
(54)【発明の名称】　流体機器の騒音低減構造

(57)【要約】
【目的】　騒音発生源である流体機器の流路の湾曲部において、流路の内壁に軟体多孔質材料からなる吸音材を配設することにより、渦の発生を効果的に抑え、騒音を抑える。
【構成】　送風機などの湾曲流路の内壁に、軟質の多孔質材料からなる薄い吸音材６を結合する。吸音材６は例えば線径２００μｍ以下のニツケル合金線、軟鋼線または合成樹脂（高分子材）からなる織布であつて、湾曲流路の内壁と織布の間に１～５㎜の断続的空隙を備える。



1：シロツコ型送風機
3：翼車
6，16：吸音材
7：ダクト部
17：曲りダクト

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【特許請求の範囲】

【請求項１】送風機、圧縮機などの湾曲流路の内壁に、軟体の多孔質材料からなる薄いシート状の吸音材を結合し、空気流動による騒音を低減する、流体機器の騒音低減構造。

【請求項２】前記吸音材が線径２００μm 以下のニツケル合金線または軟鋼線からなる織布であつて、湾曲流路の内壁と織布の間に１～５㎜の断続的空隙を備えた、請求項１に記載の流体機器の騒音低減構造。

【請求項３】前記吸音材が炭素繊維、ロツクウール、グラスウール、セラミツクス、合成樹脂などの繊維からなる厚さ０．１～７㎜の織布である、請求項１に記載の流体機器の騒音低減構造。

【請求項４】前記吸音材が炭素繊維、ロツクウール、グラスウール、セラミツクス、合成樹脂などからなる厚さ０．１～７㎜のマツトである、請求項１に記載の流体機器の騒音低減構造。

【請求項５】前記吸音材が炭素繊維、ロツクウール、グラスウール、セラミツクス、合成樹脂などの繊維からなる厚さ０．１～７㎜のフエルトである、請求項１に記載の流体機器の騒音低減構造。

【発明の詳細な説明】

【０００１】

【産業上の利用分野】本発明は回転式送風機、圧縮機、内燃機関、ガスタービン、蒸気タービン、高圧流体ダクト、空調ダクト、ジエツト噴流出口デイフユーザなどの流体機器を流動する流体が、流路の方向、流路の断面積などの変化に伴い発生する渦と、流体の渦が流路の内壁に衝突する時の騒音とを、広帯周波数域に亘り低減する流体機器の騒音低減構造に関するものである。

【０００２】

【従来の技術】送風機、圧縮機、ガスタービン、蒸気タービンなどの流体機械では、翼車とケーシングとの間で流体の流れが乱れ、騒音を発生する。騒音を低減するために、翼の形状を改良したり、翼にセラミツクスなどの多孔質材料を用いたりしているが、目標とする効果を得るには至つていない。流体機器の小型化は流体の高速化を招き、騒音を一層発生しやすくしている。送風機、高圧流体ダクト、空調ダクト、ジエツト噴流出口デイフユーザなどの主として空気を扱う流体機器では、外周壁にブチルゴム、発砲体、ロツクウールまたはグラスウールなどの遮音材を巻き付けている。

【０００３】図５に示すように、シロツコ型送風機の場合は、箱２０の内部に送風機１を収容し、送風機１のケーシング５およびダクト部７と、箱２０の内壁との間の空部へ、ブチルゴム発泡体、ロツクウール、グラスウールなどの遮音材２１を充填している。図６に示すように、曲りダクト１７の場合は、外周壁に前述のブチルゴムまたは発泡体などの遮音材２２を巻き付け、さらに曲り部に流線形の固定翼２５を配設したりしている。

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【０００４】

【発明が解決しようとする課題】しかし、上述の構造は流体機器の大型化を招き、遮音材２１，２２の使用量も多くなり、コストの増加を来たし、流体が固体壁に衝突する時発生する振動は避けられない。

【０００５】本発明の目的は上述の問題に鑑み、騒音発生源である流体機器の流路の湾曲部において、流路の内壁に多孔質材料からなる吸音材を配設することにより、渦の発生を効果的に抑え、騒音を抑えると同時に、固体壁の衝突から発生する振動を緩和する、流体機器の騒音低減構造を提供することにある。

【０００６】

【課題を解決するための手段】上記目的を達成するために、本発明の構成は送風機、圧縮機などの湾曲流路の内壁に、軟体の多孔質材料からなる薄いシート状の吸音材を結合したものである。

【０００７】

【作用】流体の流れは流路の湾曲部で乱れ、渦を発生しつつ流路の内壁に衝突し、騒音を発生する。本発明では、流体機器の流路、特に流路の湾曲部の内壁に多孔質材料からなる吸音材を結合する。多孔質材料からなる吸音材は流体の流れが流路の内壁に衝突するのを緩和し、また粘性底層を吸収するので、流体の渦の発生が抑えられ、流体の流動騒音が低減される。

【０００８】

【実施例】図１は本発明による騒音低減構造を備えたシロツコ型送風機の側面断面図である。シロツコ型送風機１はほぼ円筒形をなすケーシング５の内部に、円筒形の翼車３を配設される。翼車３は図示してないスポークにより回転軸２に結合される。翼車３は周方向等間隔に多数の羽根（約３５枚）を備えており、翼車３の両端の入口４（紙面と直角な方向の端部）から空気を吸い込み、翼車３の外周側へ吐き出す。翼車３から吐き出された空気は、矢印で示すように、ケーシング５の内周壁に沿つて流れ、ケーシング５と一体のダクト部７を経て、出口８から図示してない接続ダクトへ流れる。ケーシング５の内部の空気流が変化する部分、すなわちケーシング５とダクト部７との接続部分で、空気流はダクト部７の内壁へ衝突して渦を発生させる。つまり、空気流はダクト部７の内壁を叩き、それにより発生する渦が生長しまたは潰れる時に騒音を発生する。

【０００９】本発明はケーシング５とダクト部７の空気流が変化する部分の内壁に、多孔質材料からなる吸音材６を張り付け、空気流がケーシング５とダクト部７の各内壁へ衝突するのを緩和し、粘性底層を吸収させ、渦の発生を阻止するものである。吸音材６の始端部６ａは空気流の方向が変化する部分、すなわちケーシング５の内周壁に沿う旋回流とダクト部７に沿う直進流との境界部に配され、かつケーシング５の内周壁と吸音材６との間に段差が生じないように、吸音材６の始端部６ａは厚さ

が次第に所定の厚さtになるように構成する。吸音材6の長さLは、流路に変化がなく、空気流が安定するまでの区間とする。

【0010】図示の実施例では、ダクト部7のケーシング5との付根の部分（ノーズ）7aでは、空気流は連続的でなく不規則なものであるので、この部分には吸音材を設けてもあまり効果はない。

【0011】吸音材6は線径200μm 以下のニツケル合金線または軟鋼線を編成してなる織布であつて、ダクト部7の内壁と織布との間に1～5㎜の断続的空隙が存するように結合する。吸音材6は炭素繊維、ロツクウール、グラスウール、セラミツクス、合成樹脂などの繊維からなる厚さ0．1～7㎜の織布である。フエルトまたはマツトの場合は厚さ1～7㎜で一体のものを用いる。また吸音材のニツトでもよい。

【0012】回転する翼車3から径外方へ流出する空気流は、円筒状のケーシング5に沿つて旋回し、ダクト部7へ向う時吸音材6に衝突する。吸音材6は空気流とダクト部7の内壁との直接的衝突を防ぐ。吸音材6は空気流の衝突に対し、空気の一部を複雑な絡み合つた細い通路へ導いて緩和する。したがつて、翼車3からの空気流はダクト部7の内壁付近での軟体多孔質材のため渦の発生を抑えられ、吸音材6と線aとの間で一様な整流となり出口8へ直進する。

【0013】一方、ケーシング5とダクト部7の付根の部分（ノーズ）7aでは、空気流が停滞し、翼車3の外周側に沿う線bとの間は、空気流速が遅く圧力が高い領域を形成する。線aと吸音材6との間の低圧領域と、線bと翼車3との間の高圧領域との間で、図に示すような大きな渦31が発生するが、出口8から延長する接続ダクトでは圧力差が解消するので、渦31はやがて接続ダクトを流れる内に消失する。

＊【0014】図2に示すように、本発明による吸音材6を備えていないシロツコ型送風機の場合は、空気流は旋回方向外側でダクト部7の内壁へ衝突する。つまり、空気流はダクト部7の内壁を叩き、騒音を発生し、同時にダクト部7の内壁に沿つて無数の小さな渦32を発生する。

【0015】図3は本発明による騒音低減構造を備えた曲りダクト17の側面断面図である。ダクト17の入口14と出口18の各向きは直交しており、入口14からダクト17へ入つた空気は出口18へ向う途中でダクト17の内壁へ衝突するが、ダクト17の出口側の内壁は全周面に吸音材16を結合され、空気流の衝突を緩和し、渦と騒音の発生を抑える。吸音材16の始端部16aは、ダクト17の内壁との間に段差が生じないように、厚さが次第に所定の厚さになるよう構成される。したがつて、図6に示すような流線形の翼25は不要になる。

【0016】表1は本発明による次の吸音材6を備えたシロツコ型送風機と、吸音材を備えていないシロツコ型送風機との比較試験の結果を示す。本試験に用いたシロツコ型送風機1は、翼車3の羽根は35枚、送風量は8 m³／min である。騒音の計測には送風機1の出口8の500㎜上方に設置した騒音計（Aスケールを使用）と周波数分析器を用いた。

【0017】吸音材

A型　軟鋼製剛体壁（吸音材なし）

B型　厚さ7㎜の炭素繊維フエルト（14．14g）

C型　厚さ7㎜のステンレス極細線のフエルト（66．3g）

D型　ステンレスメツシユ#180（10g）　1枚

E型　線径100μm 以下のステンレス極細線のニツト（16．7g）

［表1］　送風機の比較試験結果

	A型	B型	C型	D型	E型
騒音レベル dB(A)	79.1	77.4	78.2	78.0	78.5

次に、本発明による吸音材を備えたシロツコ型送風機において、翼車3を回転した状態と、翼車3を回転しない状態とで、スピーカーでつくつたホワイトノイズを、入※口4から送風機の流路へ流した時の騒音をそれぞれ測定した。測定結果は表2のとおりである。

【0018】

［表2］　騒音測定結果

	B型	C型	D型	E型
ホワイトノイズ dB(A)	1.7	0.9	0.1	0.6
シロツコ型送風機 dB(A)	3.8	2.1	0.4	2.0

以上の試験結果から、回転する翼車3から送り出されてくる空気が、ダクト部7で発生する時の騒音は、吸音材6により広い周波数域に亘り、大幅に低減されることが分つた。翼車3を回転しない状態（空気流がない時）のホワイトノイズの低減効果は顕著でないが、翼車3を回転した状態（空気流がある時）の騒音低減効果は顕著であることが分る。

【0019】なお、吸音材6を備えたシロツコ型送風機★と、吸音材を備えていないシロツコ型送風機との比較試験で、翼車3を回転しないで、周波数が10Hzから5kHzの広範囲のホワイトノイズを、入口4から送風機の流路へ流した時の、騒音計で計測された騒音レベル（dB）を比較すると、空気流に伴う渦の発生がないため、騒音レベルの差は殆どなかつた。

【0020】図4は本発明によるB型の吸音材6を備えたシロツコ型送風機と、吸音材を備えていないシロツコ

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型送風機の各流路へそれぞれ空気を流した時の、騒音の周波数分析測定結果を表す。

【００２１】本発明による吸音材６を備えたシロツコ型送風機は、吸音材を備えていないものに比べて、１０Ｈｚ～５ｋＨｚの全域に亘り、騒音レベルを低減できることが分る。

【００２２】

【発明の効果】本発明は上述のように、送風機、ダクトなどの流体機器の流路の内壁にフエルト、織物などの多孔質材料からなる吸音材を内張りしたことにより、流体の流れが流路の内壁を叩くエネルギが吸収され、渦の発生が抑えられるので、流動騒音が大幅に低減される。

【００２３】吸音材は極く薄いものでよく、流路の内壁に張り付けるものであり、流体の流れの衝突により加振される流路の外壁に遮音材を結合して騒音を抑え込むものと比べて、材料の使用量が少ないのでコストを節減でき、流体機器の外形に寸法変化をもたらさないので、設置空間を縮小できる。

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【図面の簡単な説明】

【図１】本発明に係る騒音低減構造を備えたシロツコ型送風機の側面断面図である。

【図２】同騒音低減構造を備えていないものの作用を説明する側面断面図である。

【図３】本発明による騒音低減構造を備えた曲りダクトの側面断面図である。

【図４】本発明による騒音低減構造を備えたシロツコ型送風機と、騒音低減構造を備えていないものとの騒音低減効果を表す線図である。

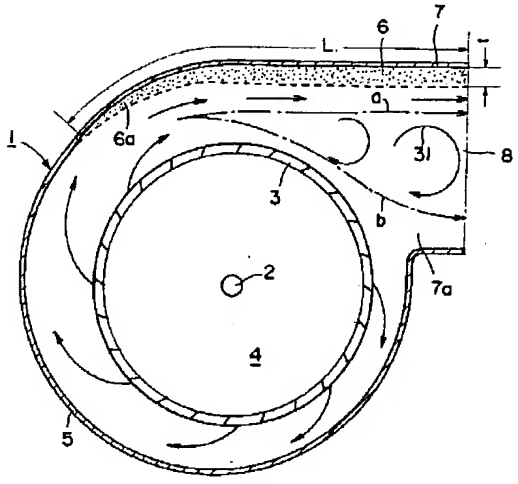
【図５】従来の騒音低減構造を備えたシロツコ型送風機の側面断面図である。

【図６】従来の騒音低減構造を備えた曲りダクトの側面断面図である。

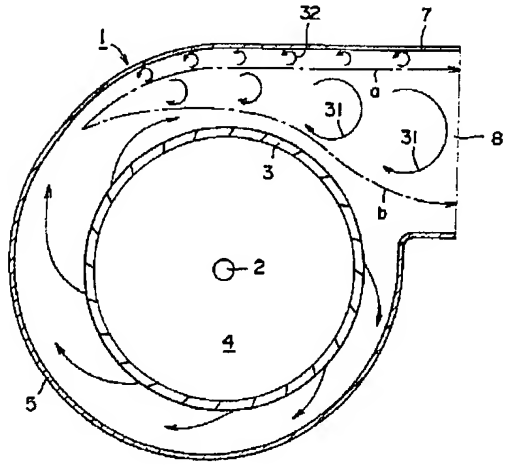
【符号の説明】

１：シロツコ型送風機　３：翼車　６，１６：吸音材
７：ダクト部　１７：曲りダクト

【図1】

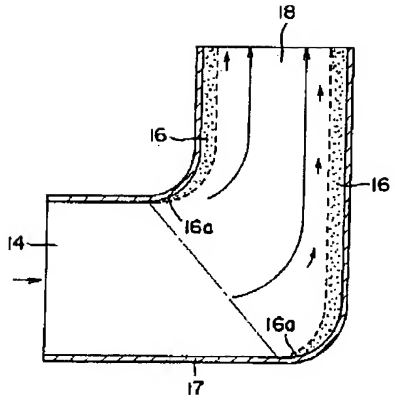


【図2】

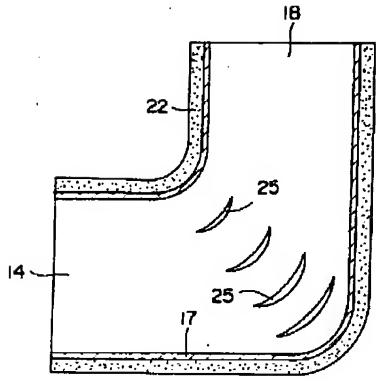


1：シロツコ型送風機
3：翼車
6，16：吸音材
7：ダクト部
17：曲りダクト

【図3】


18
16
16
16a
14
16a
17

【図6】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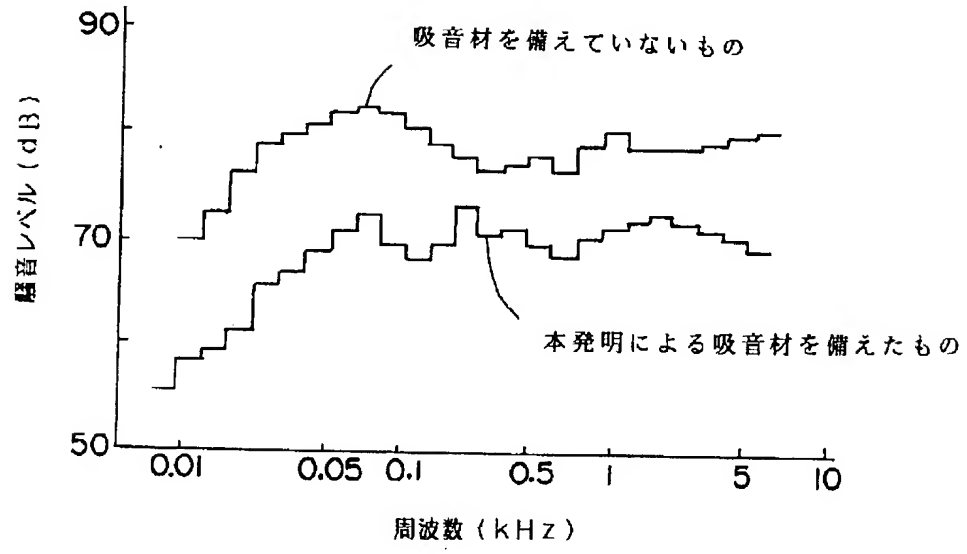
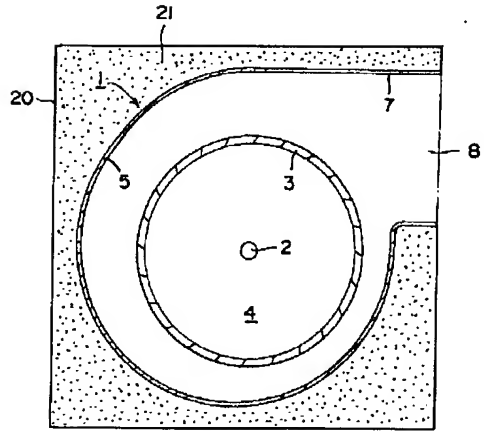
14
25
17

【図4】


90
70
50
騒音レベル（dB）
吸音材を備えていないもの
本発明による吸音材を備えたもの
0.01
0.05
0.1
0.5
1
5
10
周波数（kHz）

【図5】


21
20
1
7
8
5
3
2
4

フロントページの続き

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ABSTRACT:

PURPOSE: To effectively suppress the formation of vortex and suppress noise
by providing a sound absorbing member consisting of a soft porous material on
the inner wall of a passage in the curved part of the passage of a fluid
equipment which is a noise generating source.

CONSTITUTION: Onto the inner wall of a curved passage in a blower 1 or the
like, a thin sound absorbing material 6 consisting of a soft porous material is
connected. The sound absorbing material 6 is formed of, for example, a fabric
consisting of nickel alloy wire, soft steel wire or synthetic resin (polymer
material) having a wire diameter less than 200μm, which is provided with an
intermittent void of 1-5mm between the inner wall of the curved passage and the
fabric.

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(54) NOISE REDUCING DEVICE FOR FLUID EQUIPMENT

(57)Abstract:

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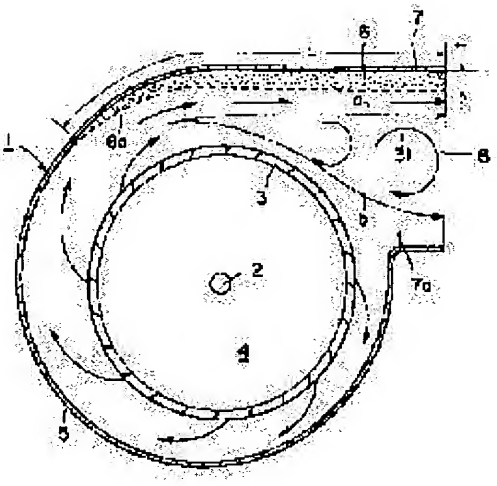

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* NOTICES *

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3.In the drawings, any words are not translated.

CLAIMS

[Claim(s)]
[Claim 1] Noise-reduction structure of a fluid device of combining the acoustic material of the shape of a thin sheet which becomes the wall of curve passage, such as a blower and a compressor, from a soft bodied porous material, and reducing the noise by air flow.
[Claim 2] Said acoustic material is 200 micrometers of wire sizes. Noise-reduction structure of the fluid device according to claim 1 equipped with the 1-5mm intermittent opening between the wall of ****** and curve passage, and textile fabrics with the textile fabrics which consist of the following nickel alloy lines or mild steel lines.
[Claim 3] Noise-reduction structure of the fluid device according to claim 1 which is the textile fabrics with a thickness of 0.1-7mm with which said acoustic material consists of fiber, such as a carbon fiber, rock wool, glass wool, ceramics, and synthetic resin.
[Claim 4] Noise-reduction structure of the fluid device according to claim 1 which is the mat with a thickness of 0.1-7mm with which said acoustic material consists of a carbon fiber, rock wool, glass wool, ceramics, synthetic resin, etc.
[Claim 5] Noise-reduction structure of the fluid device according to claim 1 which is felt with a thickness of 0.1-7mm which said acoustic material becomes from fiber, such as a carbon fiber, rock wool, glass wool, ceramics, and synthetic resin.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] This invention relates to the noise-reduction structure of a fluid device of continuing and reducing the noise in case the eddy which the fluid which flows fluid devices, such as a rotating type blower, a compressor, an internal combustion engine, a gas turbine, a steam turbine, a high-pressure fluid duct, an air-conditioning duct, and a jet-blast outlet diffuser, generates with change of the direction of passage, the cross section of passage, etc., and the eddy of a fluid collide with the wall of passage in an extensive band frequency region.
[0002]
[Description of the Prior Art] In fluid machineries, such as a blower, a compressor, a gas turbine, and a steam turbine, the flow of a fluid generates turbulence and the noise between a disk and casing. Although the configuration of an aerofoil is improved or porous materials, such as ceramics, are used for the aerofoil in order to reduce the noise, for acquiring target effectiveness, it is not very much. The noise is made much more easy for the miniaturization of a fluid device to cause improvement in the speed of a fluid, and to generate. The blower, the high-pressure fluid duct, the air-conditioning duct, the jet-blast outlet diffuser, etc. have twisted insulators, such as isobutylene isoprene rubber, a firing object, rock wool, or glass wool, around the peripheral wall by the fluid device which mainly treats air.
[0003] As shown in drawing 5 , in the case of the sirocco mold blower, the blower 1 was held in the interior of a box 20, and it is filled up with the insulators 21, such as isobutylene-isoprene-rubber foam, rock wool, and glass wool, to the hollow part between the casing 5 of a blower 1 and the duct section 7, and the wall of a box 20. As shown in drawing 6 , in the case of the knee duct 17, the insulators 22, such as the above-mentioned isobutylene isoprene rubber or foam, are twisted around a peripheral wall, and it is arranging the streamlined fixed wing 25 in an elbow further.
[0004]
[Problem(s) to be Solved by the Invention] However, above-mentioned structure causes enlargement of a fluid device, the amount of the insulators 21 and 22 used also increases, the increment in cost is caused, and vibration generated when a fluid collides with a solid-state wall is not avoided.
[0005] It is in the purpose of this invention offering the noise-reduction structure of the fluid device which eases vibration generated from the collision of a solid-state wall at the same time it suppresses vortical generating effectively and suppresses the noise by arranging the acoustic material which becomes the wall of passage from a porous material in view of an above-mentioned problem in the bend of the passage of the fluid device which is a noise emitting source.
[0006]
[Means for Solving the Problem] In order to attain the above-mentioned purpose, the configuration of this invention combines the acoustic material of the shape of a thin sheet which becomes the wall of curve passage, such as a blower and a compressor, from a soft bodied porous material.
[0007]
[Function] The flow of a fluid collides with the wall of passage, generating turbulence and an eddy in the bend of passage, and generates the noise. In this invention, the acoustic material which becomes the wall of the bend of the passage of a fluid device, especially passage from a porous material is combined. Since the acoustic material which consists of a porous material eases that the flow of a fluid collides

with the wall of passage and absorbs a viscous sub-layer, generating of the eddy of a fluid is suppressed and the flow noise of a fluid is reduced.

[0008]

[Example] Drawing 1 is the side-face sectional view of the sirocco mold blower equipped with the noise-reduction structure by this invention. The sirocco mold blower 1 has the disk 3 of a cylindrical shape arranged in the interior of the casing 5 which makes a cylindrical shape mostly. A disk 3 is combined with a revolving shaft 2 by the spoke which is not illustrated. The disk 3 equips hoop direction regular intervals with many wings (about 35 sheets), inhales air from the inlet port 4 (edge of space and a right-angled direction) of the both ends of a disk 3, and breathes it out to the periphery side of a disk 3. The air breathed out from the disk 3 flows to the connection duct which is not illustrated from an outlet 8 through the duct section 7 of ****** flow, casing 5, and one to the inner circle wall of casing 5, as an arrow head shows. Airstream collides to the wall of the duct section 7, and generates an eddy in the part from which the airstream inside casing 5 changes, i.e., the connection part of casing 5 and the duct section 7. That is, airstream strikes the wall of the duct section 7, and when the eddy which this generates is grown or crushed, it generates the noise.

[0009] This invention sticks the acoustic material 6 which becomes the wall of a part from which the airstream of casing 5 and the duct section 7 changes from a porous material, eases that airstream collides to each wall of casing 5 and the duct section 7, makes a viscous sub-layer absorb, and prevents vortical generating. Leader 6a of acoustic material 6 is constituted so that thickness may be gradually set to predetermined thickness t, so that leader 6a of acoustic material 6 may be allotted to the boundary section with the part from which the direction of airstream changes, i.e., the revolution style which meets the inner circle wall of casing 5, and the rectilinear-propagation style in alignment with the duct section 7 and a level difference may not arise between the inner circle wall of casing 5, and acoustic material 6. Die-length L of acoustic material 6 does not have change in passage, and is taken as the section until airstream is stabilized.

[0010] It is almost ineffective even if it prepares acoustic material in this part in the example of illustration by partial (nose) 7a of the root with the casing 5 of the duct section 7, since it is [that airstream is not continuous and] irregular.

[0011] Acoustic material 6 is 200 micrometers of wire sizes. It joins together so that a 1-5mm intermittent opening may consist between the wall of ****** and the duct section 7, and textile fabrics with the textile fabrics which come to compose the following nickel alloy lines or mild steel lines. Acoustic material 6 is textile fabrics with a thickness of 0.1-7mm it is thin from fiber, such as a carbon fiber, rock wool, glass wool, ceramics, and synthetic resin. In the case of felt or a mat, the thing of one is used by 1-7mm in thickness. Moreover, Nitto of acoustic material is sufficient.

[0012] The airstream which flows into the method of the outside of a path out of the rotating disk 3 carries out ****** revolution at the cylinder-like casing 5, and collides with acoustic material 6 to the duct section 7 at the time of the other side. Acoustic material 6 prevents the direct collision with airstream and the wall of the duct section 7. acoustic material 6 -- the collision of airstream -- receiving -- a part of air -- complicated debt ****** -- it leads to a thin path and eases. Therefore, the airstream from a disk 3 can suppress vortical generating for the soft bodied porosity material near the wall of the duct section 7, turns into acoustic material 6 and rectification uniform between Lines a, and goes straight on to an outlet 8.

[0013] On the other hand, in partial (nose) 7a of the root of casing 5 and the duct section 7, airstream stagnates and the field where the air rate of flow is slow and where a pressure is high is formed between the lines b in alignment with the periphery side of a disk 3. Although the big eddy 31 as shown in drawing occurs between the low voltage field between Line a and acoustic material 6, and the high-pressure field between Line b and a disk 3, since differential pressure is solved by the connection duct extended from an outlet 8, while an eddy 31 flows a connection duct soon, it disappears.

[0014] As shown in drawing 2 , in the case of the sirocco mold blower which is not equipped with the acoustic material 6 by this invention, airstream collides to the wall of the duct section 7 on the revolution direction outside. That is, airstream strikes the wall of the duct section 7, generates the noise, and generates the small eddy 32 of a ****** infinite number in the wall of the duct section 7 at coincidence.

[0015] Drawing 3 is the side-face sectional view of the knee duct 17 equipped with the noise-reduction

structure by this invention. Each sense of the inlet port 14 of a duct 17 and an outlet 18 lies at right angles, although ON **** air collides to an outlet 18 to the wall of a duct 17 in the middle of other, the wall of the outlet side of a duct 17 has acoustic material 16 combined by the perimeter side from an inlet port 14 to a duct 17, the collision of airstream is eased, and generating of an eddy and the noise is suppressed. Leader 16a of acoustic material 16 is constituted so that a level difference may not arise between the walls of a duct 17, and thickness may turn into predetermined thickness gradually. Therefore, the aerofoil 25 of a streamline shape as shown in drawing 6 becomes unnecessary.

[0016] Table 1 shows the result of the comparative study of the sirocco mold blower equipped with the following acoustic material 6 by this invention, and the sirocco mold blower which is not equipped with acoustic material. the sirocco mold blower 1 used for the exam -- the wing of a disk 3 -- 35 sheets and blast weight -- 8m3/min it is . The noise meter (A scale is used) and frequency analyzer installed in 500mm upper part of the outlet 8 of a blower 1 were used for measurement of the noise.

[0017] Acoustic-material A mold Rigid-body wall made from mild steel (with no acoustic material) B mold Carbon fiber felt with a thickness of 7mm (14.14g)
C mold Felt of a stainless steel extra fine wire with a thickness of 7mm (66.3g)
D mold Stainless steel mesh #180 (10g) One sheet E mold 100 micrometers of wire sizes Nitto of the following stainless steel extra fine wires (16.7g)
[Table 1] The comparative study result of a blower A mold B mold C mold D mold E mold Noise level dB (A) 79.1 77.4 78.2 78.0 In the sirocco mold blower equipped with 78.5, next the acoustic material by this invention, in the condition of having rotated the disk 3, and the condition of not rotating a disk 3 The noise when passing the **** white noise attached with a loudspeaker from an inlet port 4 to the passage of a blower was measured, respectively. A measurement result is as in Table 2.

[0018]
[Table 2] A measurement-of-sound-level result B mold C mold D mold E mold White noise dB (A) 1.7 0.9 0.1 0.6 Sirocco mold blower dB (A) 3.8 2.1 0.4 The noise in case the air sent out from the disk 3 which rotates from 2.0 or more test results occurs in the duct section 7 is ** which covering a large frequency region with acoustic material 6, and decreasing sharply divides. Although the reduction effectiveness of white noise in the condition (when there is no airstream) of not rotating a disk 3 is not remarkable, it turns out that the noise-reduction effectiveness in the condition (when there is airstream) of having rotated the disk 3 is remarkable.

[0019] In addition, since there is no generating of the eddy accompanying airstream when a frequency compares the noise level (dB) measured with the noise meter when passing a 5kHz wide range white noise to the passage of an inlet port 4 to a blower from 10Hz by the comparative study of the sirocco mold blower equipped with acoustic material 6, and the sirocco mold blower which is not equipped with acoustic material without rotating a disk 3, most differences of noise level are inside ****.

[0020] Drawing 4 expresses the frequency-analysis measurement result of the noise when passing air, respectively to each passage of the sirocco mold blower equipped with the acoustic material 6 of B mold by this invention, and the sirocco mold blower which is not equipped with acoustic material.

[0021] The sirocco mold blower equipped with the acoustic material 6 by this invention continues throughout 10Hz - 5kHz compared with what is not equipped with acoustic material, and it turns out that noise level can be reduced.

[0022]
[Effect of the Invention] Since the energy to which the flow of a fluid strikes the wall of passage when this invention lined the acoustic material which becomes the wall of the passage of fluid devices, such as a blower and a duct, from porous materials, such as felt and textiles, as mentioned above is absorbed and vortical generating is suppressed, the flow noise is reduced sharply.

[0023] acoustic material -- **** -- it is easy to be thin and sticks on the wall of passage, compared with what combines an insulator with the outer wall of the passage as for which excitation is carried out by the collision of the flow of a fluid, and holds down the noise, since there is little amount of the ingredient used, cost is reducible, and since a dimensional change is not brought to the appearance of a fluid device, installation space is reducible.

[Translation done.]